

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Original) An acoustic device, comprising:
an acoustic enclosure having an exterior surface and enclosing an interior volume and further having an aperture in said exterior surface;
a first acoustic driver and a second acoustic driver, each having a first radiating surface, mounted so that said first radiating surface faces said enclosure interior volume;
a passive radiator module, comprising a closed three dimensional structure defining a cavity with an opening, mounted in said aperture to define a cavity in said enclosure, separated from said interior volume;
a first passive radiator and a second passive radiator, each having a radiating element having two opposing surfaces, mounted in said module so that one of said surfaces faces said cavity; and
a baffle structure in said enclosure, between said first acoustic driver and said first passive radiator from said second acoustic driver and said second passive radiator.
2. (Original) Each and every novel feature and novel combination of features present in or possessed by the apparatus and techniques herein disclosed.
3. (New) A module for use in an acoustic enclosure, comprising,
a closed three dimensional structure defining a cavity with an opening,
a first passive radiator having a vibratile element having a first and a second surface and further having an intended direction of motion along a first axis,
said first passive radiator mounted in said structure so that said first surface faces said cavity,

said first passive radiator characterized by a mass and a surface area,
a second passive radiator having a vibratile element having a first and a second surface and further having an intended direction of motion along a second axis,

said second passive radiator mounted in said structure so that said first surface faces said cavity,

said second passive radiator characterized by a mass and a surface area,

wherein said first passive radiator and said second passive radiator are positioned so that said first passive radiator intended direction of motion and said second passive radiator intended direction of motion are substantially parallel and wherein said first passive radiator vibratile element and said second passive vibratile passive element are noncoplanar, and

wherein said module is constructed and arranged to be insertable in a first aperture in an acoustic enclosure enclosing an interior volume so that said first passive radiator second surface faces said interior volume and so that said second passive radiator second surface faces said interior volume.

4. (New) A module in accordance with claim 3, wherein said first axis and said second axis are substantially coaxial.

5. (New) A module in accordance with claim 3, wherein said first passive radiator vibratile element mass and said second vibratile element mass are substantially equal.

6. (New) A module in accordance with claim 5, wherein said first vibratile element surface area and said second vibratile element surface area are substantially equal.

7. (New) A module in accordance with claim 3, wherein said first vibratile element surface area and said second vibratile element surface area are substantially equal.

8. (New) A module in accordance with claim 3, wherein said module is constructed and arranged to be mountable in an aperture in said acoustic enclosure so that said first passive radiator intended direction of motion and said second passive radiator intended direction of motion are substantially transverse to said aperture.

9. (New) An acoustic device, comprising,

an acoustic enclosure bounded by a three dimensional bounding figure said enclosure having walls defining an enclosure interior volume,

an acoustic driver having a first surface and a second surface about a first axis,

wherein said acoustic driver is mounted in said acoustic enclosure so that said first surface faces said interior volume,

a cavity in said acoustic enclosure lying substantially within said bounding figure, and

a first passive radiator having a first surface and a second surface and an intended direction of motion along a second axis, mounted in said acoustic enclosure so that said first passive radiator first surface faces said cavity and said passive radiator second surface faces said enclosure interior,

wherein said acoustic enclosure is constructed and arranged so that all acoustic paths between said acoustic driver first surface and said cavity include said first passive radiator.

10. (New) An acoustic device in accordance with claim 9, and further comprising a second passive radiator having a first surface and a second surface and an intended direction of motion along a third axis,

said second passive radiator mounted so that second passive radiator first surface faces said cavity and said second passive radiator second surface faces said enclosure interior,

said second passive radiator further mounted so that said first passive radiator intended direction of motion and said second passive radiator intended direction of motion are substantially parallel,

wherein said acoustic enclosure is constructed and arranged so that all acoustic paths between said acoustic driver first surface and said cavity include said first passive radiator or said second passive radiator.

11. (New) An acoustic device in accordance with claim 10 constructed and arranged so that operation of said acoustic driver causes vibration of said first passive radiator and said second passive radiator,

said vibration of said first passive radiator and said second passive radiator radiating acoustic energy in phase into said cavity,

said vibration resulting in inertial forces of said first passive radiator and said second passive radiator,

wherein said first passive radiator and said second passive radiator are positioned so that a vector sum of said inertial forces of the first passive radiator and said second passive radiator is less than either of said inertial forces of said first passive radiator and said second passive radiator.

12. (New) An acoustic device in accordance with claim 11 wherein said first and second passive radiators are constructed and arranged so that said vibration of said first passive radiator and said vibration of said second passive radiator are mechanically out of phase.

13. (New) An acoustic device in accordance with claim 10,
said acoustic driver having an intended direction of motion wherein said acoustic driver intended direction of motion is substantially parallel with at least one of said first passive radiator intended direction of motion and said second passive radiator intended direction of motion.

14. (New) An acoustic device in accordance with claim 9 and further comprising an acoustic driver mounted in said acoustic enclosure so that said acoustic driver radiates acoustic energy into said interior volume,

a plurality of passive radiators acoustically coupling said interior volume and said cavity,
and wherein all acoustic paths from said acoustic driver through said interior volume to said cavity include at least one of said plurality of passive radiators.

15. (New) An acoustic device comprising,
an acoustic enclosure bounded by a three dimensional bounding figure,
said enclosure having walls defining an enclosure interior volume,
a cavity in said acoustic enclosure lying substantially within said bounding figure,
an acoustical driver mounted in said acoustic enclosure,

said acoustic driver having a vibratile diaphragm for vibrating along a first axis to radiate acoustic energy,

said diaphragm having a first radiating surface facing the exterior of said acoustic enclosure for radiating acoustic energy to said exterior and a second radiating surface constructed and arranged so that substantially all of said second radiating surface faces said interior volume for radiating acoustic energy into said acoustic volume, and

a first passive radiator acoustically coupling said interior volume and said cavity, said first passive radiator comprising a first vibratile diaphragm,

said first vibratile diaphragm constructed and arranged to vibrate along a second axis responsive to said acoustic energy radiated into said interior volume to radiate acoustic energy into said cavity.

16. (New) An acoustic device in accordance with claim 15 wherein said first axis and said second axis are parallel.

17. (New) An acoustic device in accordance with claim 10, wherein said acoustic device is constructed and arranged so that said first passive radiator and said second passive radiator vibrate mechanically out of phase responsive to said acoustic energy radiated into said interior volume by said acoustic driver.

18. (New) An acoustic device in accordance with claim 17, wherein said second axis and said third axis are coincident.

19. (New) An acoustic device in accordance with claim 18 wherein said coincident second and third axes are parallel with said first axis.

20. (New) An acoustic device in accordance with claim 17 wherein said second axis and said third axis are parallel with said first axis.

21. (New) An acoustic device, comprising,
an acoustic enclosure having an interior,
a first acoustic driver having a first axis and a second acoustic driver, mounted in said enclosure,

a first passive radiator having a second axis and a second passive radiator mounted in said enclosure,
and

a baffle structure in said enclosure acoustically isolating said first acoustic driver and said first passive radiator from said second acoustic driver and said second passive radiator.

22. (New) An acoustic device in accordance with claim 21 and further comprising,
a third acoustic driver and a fourth acoustic driver,

wherein said baffle structure acoustically isolates said third acoustic driver from and first acoustic driver and said first passive radiator and wherein said baffle structure further acoustically isolates said fourth acoustic driver from said second acoustic driver and said second passive radiator.

23. (New) An acoustic device in accordance with claim 22 wherein said first and third acoustic drivers are mounted on a first common face of said enclosure and wherein said second and fourth acoustic drivers are mounted on a second common face of said enclosure.

24. (New) An acoustic device in accordance with claim 23 wherein said first acoustic driver is positioned above said third acoustic driver and wherein said fourth acoustic driver is positioned above said second acoustic driver.

25. (New) An acoustic device in accordance with claim 22 wherein said first acoustic driver is closer to a first quadrant of said first passive radiator surface than to other quadrants of said first passive radiator surface and wherein said fourth acoustic driver is closer to a second quadrant of said first passive radiator surface than to other quadrants of said first passive radiator surface,

wherein said first passive radiator first quadrant and said first passive radiator second quadrant are opposed, and

wherein said second acoustic driver is closer to a first quadrant of said second passive radiator than to other quadrants of said second passive radiator,

wherein said third acoustic driver is closer to a second quadrant of said second passive radiator than to other quadrants of said second passive radiator,

and wherein said second passive radiator first quadrant and said second passive radiator second quadrant are opposed.

26. (New) An acoustic device in accordance with claim 21,
said enclosure having planar walls,
said first acoustic driver is constructed and arranged so that said first axis is perpendicular to a first of said planar walls,

wherein said first passive radiator is constructed and arranged so that said first passive radiator intended direction of motion is perpendicular to a second of said walls,
and

wherein said first wall and said second wall are perpendicular.

27. (New) An acoustic device comprising,
an acoustic enclosure having an interior and an exterior,
an acoustic driver mounted in said enclosure so that said acoustic driver radiates acoustic energy to said interior,
a plurality greater than two of passive radiators mounted in said enclosure,
each of said passive radiators vibrating responsive to said acoustic energy radiated to said interior,

said vibrating of each of said passive radiators being characterized by an intended direction of motion and an inertial force;

wherein said passive radiators are constructed and arranged so that the sum of said inertial forces is less than any one of said inertial forces.

28. (New) An acoustic device, in accordance with claim 27 wherein said vector sum of said inertial forces is substantially zero.

29. (New) An acoustic device in accordance with claim 27 comprising a plurality of acoustic drivers radiating acoustic energy to said interior,

each of said passive radiators vibrating responsive to said acoustic energy radiated to said interior,

said vibrating of each of said passive radiators being characterized by an intended direction of motion and an inertial force

wherein said passive radiators are constructed and arranged so that the vector sum of said inertial forces is less than any one of said inertial forces.

30. (New) An acoustic device, comprising,

an acoustic enclosure enclosing a volume of air,

a first passive radiator having a vibratile surface mounted in a wall of said acoustic enclosure,

a first plurality of acoustic drivers for radiating first acoustic energy into said acoustic enclosure so that said acoustic energy interacts with said volume of air to cause said vibratile surface to vibrate wherein said plurality of acoustic drivers are positioned symmetrically relative to said first passive radiator,

a second passive radiator having a vibratile surface mounted in a wall of said acoustic enclosure,

a second plurality of acoustic drivers for radiating second acoustic energy into said acoustic enclosure so that said second acoustic energy interacts with said volume of air to cause said second passive radiator surface to vibrate wherein said second plurality of acoustic drivers are positioned symmetrically relative to said second passive radiator; and

a baffle structure inside said acoustic device acoustically isolating said first passive radiator and said first plurality of acoustic drivers from said second passive radiator and said second plurality of acoustic drivers.

31. (New) An acoustic device for coupling to a structural component comprising,

an acoustic enclosure,

an acoustic driver mounted in said acoustic enclosure;

a first passive radiator mounted in said acoustic enclosure so that operation of said acoustic driver causes motion of said first passive radiator characterized by a first inertial force having direction and a magnitude;

a second passive radiator mounted in said acoustic enclosure so that operation of said acoustic driver causes motion of said second passive radiator characterized by a second inertial force having a direction and a magnitude;

wherein said first passive radiator and said second passive radiator are mounted in said acoustic enclosure so that a vector sum of said magnitudes of said first inertial force and said second inertial force is less than either of said magnitude of said first inertial force and said magnitude of said second inertial force; and

mounting elements for mechanically coupling said acoustic enclosure to said structural component.

32. (New) An acoustic device in accordance with claim 31 wherein said structural component is a vehicle chassis.

33. (New) An acoustic device, comprising,

a first acoustic enclosure,

a first acoustic driver mounted in a wall of said first enclosure,

a first passive radiator mounted in said acoustic enclosure so that said acoustic driver causes vibration of said first passive radiator wherein said vibration is characterized by a first inertial force having a magnitude and a direction a second acoustic enclosure,

a second acoustic enclosure,

a second acoustic driver mounted in a wall of said second enclosure,

a second passive radiator mounted in said acoustic enclosure so that said acoustic driver causes vibration of said second passive radiator wherein said vibration is characterized by a second inertial force having a magnitude and a direction, and

mechanical coupling structure for coupling said first acoustic enclosure and said second acoustic enclosure so that a vector sum of said inertial forces has a magnitude that

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is less than said magnitude of said first inertial force and said magnitude of said second inertial force.